CANDIDATE AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: Necturus alabamensis

COMMON NAME: Black Warrior waterdog

LEAD REGION: 4

INFORMATION CURRENT AS OF: January 5, 2001

STATUS/ACTION (Check all that apply):
__ New candidate
_X_ Continuing candidate
    _X_ Non-petitioned
    ___ Petitioned - Date petition received: ___
        ___ 90-day positive - FR date: ___
        ___ 12-month warranted but precluded - FR date: ___
        __ Is the petition requesting a reclassification of a listed species?
    ___ Listing priority change
        Former LP: ___
        New LP: ___
___ Candidate removal: Former LP: ___ (Check only one reason)
    ___ A - Taxon more abundant or widespread than previously believed or not subject to a degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.
    ___ F - Range is no longer a U.S. territory.
    ___ M - Taxon mistakenly included in past notice of review.
    ___ N - Taxon may not meet the Act's definition of "species."
    ___ X - Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Amphibian - Proteidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Alabama

CURRENT STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Alabama

LEAD REGION CONTACT (Name, phone number): Lee Andrews, 404/679-7217

LEAD FIELD OFFICE CONTACT (Office, name, phone number): Jackson, Mississippi Field Office, Linda LaClaire, 601/321-1126

BIOLOGICAL INFORMATION (Describe habitat, historic vs. current range, historic vs. current population estimates (# populations, #individuals/population), etc.):

Viosca described the Black Warrior waterdog as Necturus alabamensis in 1937. In subsequent years, the name N. alabamensis was mistakenly applied to a more common species of waterdog that occurs in the lower coastal plain. This usage continued until recently when Bart et al. (1997) clarified the taxonomy of the Black Warrior waterdog. As a result, the more common species has no valid name.

Information on the Black Warrior waterdog is limited. It received little attention between the time it was described in 1937 and the mid-1980's when it was found during surveys in the Tenn-Tom Waterway (Ashton and Peavy 1985). During this time, reference to the species, beyond field guides and summary descriptions, could be found in only three scientific publications and one unpublished Ph.D. dissertation (Hecht 1958, Neil 1963, Gunter and Brode 1964, Brode 1969).

The Black Warrior waterdog is a large, gilled, aquatic salamander with a maximum recorded length of 248 millimeters (9.8 inches) (Bailey 1995). It inhabits streams above the Fall Line within the Black Warrior River Basin (Basin) in Alabama including parts of the North River, Locust Fork, Mulberry Fork, and Sipsey Fork drainages and their tributaries. Rocks, submerged ledges, and other cover probably play an important role in determining habitat suitability (Ashton and Peavy 1986). Semi-permanent leaf beds (where they exist) are likely visited frequently (Ashton and Peavy 1986). Guyer (1997) analyzed habitat to distinguish sites with waterdogs from those lacking the species. He found that Black Warrior waterdogs were associated with clay substrates lacking silt; wide and/or shallow stream morphology; increased snail and Desmognathus (dusky salamanders) abundance; and decreased Corbicula (Asiatic clam) occurrence.

Guyer and Durflinger (1999) conducted a demographic study at the best Black Warrior waterdog population. At this locality, they sampled an area of approximately 840 meters^2 (m^2) (2,756 feet^2 (ft^2)). Within this area, all the captured waterdogs occurred in a 40 m^2 (131 ft^2) area in leaves accumulated at the base of a large dead tree that had fallen into the river. This demonstrates the importance of leaf packs for cover. All larval waterdogs captured over the years have been found exclusively in leaf packs.

Records of the historical distribution of the Black Warrior waterdog are few. This species can be expected to potentially inhabit the same streams as the threatened flattened musk turtle (Sternotherus depressus), which is also restricted to permanent streams above the Fall Line in the Basin (Mount 1975). The Black Warrior waterdog is thought to have occurred in large streams (10 m (33 ft) wide or greater), with moderate flows and alternating pools and rapids, throughout the Basin (Ashton and Peavy 1986, Bailey 1992). One hundred and twenty sites have been sampled for waterdogs since 1990 (Guyer 1997). The species has been reported recently from only ten sites (8 percent success rate) in Blount, Tuscaloosa, Walker, and Winston Counties, Alabama, despite surveys in 1990, 1991, 1992, 1994, 1996, 1997, and 1998 (Bailey 1995, Guyer 1997, 1998). Survey sites included all stream localities within the range of the species that

approached or intersected roads and had appropriate habitat. Guyer (1997) did a statistical analysis of all waterdog field survey data. He concluded that waterdogs were unlikely to have been missed if they were present, especially at sites visited more than once. The data indicated that 200 additional surveys would be needed to discover a single new locality for the species.

Bailey (2000) conducted a habitat assessment of all sites (12) which have historical records for the Black Warrior waterdog. Two sites were subsequently combined because of their proximity to each other (separated by less than a mile of stream). This adjusted the total to 11 historical sites. Assessments were based on subjective impressions of habitat suitability using parameters such as stream width and depth, water quality, substrate, structure (crevices, logs, etc.), and invertebrate fauna. Sites were stratified into four categories: good to excellent, moderate, poor to unsuitable, and impounded.

Bailey (2000) concluded that 2 (18%) of the sites were good to excellent, 3 (27%) were moderate in quality, 2 (18%) were poor to unsuitable, and 4 (36%) were in impoundments. Two of the impounded sites were based on historical collections made prior to the impoundments. The other 2 records of the species from impoundments were based on the capture of one animal at each site.

THREATS (Describe threats in terms of the five factors in section 4 of the ESA providing specific, substantive information. **If this is a removal of a species from candidate status or a change in listing priority, explain reasons for change**):

A. The present or threatened destruction, modification, or curtailment of its habitat or range. Water quality degradation is the biggest threat to the continued existence of the Black Warrior waterdog. Bailey (1995) considered water quality degradation to be the primary reason for the extirpation of this species over much of its historic range in the upper Black Warrior River system. Most streams surveyed for the Black Warrior waterdog showed evidence of water quality degradation and many appeared biologically depauperate (Bailey 1992, 1995, Guyer 1997).

Sources of point and nonpoint pollution in the Black Warrior Basin have been numerous and widespread. Water quality, and the resident aquatic fauna, have declined as a result. Pollution is generated from inadequately treated effluent from industrial plants, sanitary landfills, sewage treatment plants, and drain fields from individual private homes (U.S. Fish and Wildlife Service 1998). Poultry and cattle feedlots are other major contributors of pollution to the drainage (Deutsch et al. 1990).

The large population centers of Birmingham, Tuscaloosa, and Jasper contribute substantial runoff to the Basin. The watershed occupied by these three cities contains more industrial and residential land area than any other river basin in the State. Streams draining these areas have a history of serious water quality problems. Species of fishes, mussels, and snails (Mettee et al.1989, Hartfield 1990), and populations of the flattened musk turtle

(U.S. Fish and Wildlife Service 1990), have been extirpated from large areas of the watershed due primarily to water quality degradation.

Mettee et al. (1989) noted the absence of at least nine fish species from streams draining the Birmingham metropolitan area where they were previously common. These species were otherwise abundant and easily collected in the lower Sipsey, Mulberry, and Locust Forks. Hartfield (1990) documented the extirpation of most species of mussels from tributaries of the Black Warrior River. He conducted extensive surveys of sites where mussels had been collected previously. Although historically the Black Warrior River Basin supported at least 45 species, only 5 species of live or fresh dead mussels were found on the Locust Fork, 6 species on the Mulberry Fork and its tributaries, and 6 species on the Sipsey Fork. Locust Fork tributaries had little evidence of an extant unionid fauna. This was reflected in the lack of mussel shell in muskrat middens (refuse heaps), which were composed entirely of Corbicula.

Surface mining represents another threat to the biological integrity of streams in the Black Warrior River system and has undoubtedly affected the distribution of the Black Warrior waterdog (Bailey 1995). Strip mining for coal results in hydrologic problems (i.e., erosion, sedimentation, decline in groundwater levels, and general degradation of water quality) that affect many aquatic organisms (U.S. Fish and Wildlife Service 1998). Runoff from coal surface mining generates pollution through acidification, increased mineralization, and sediment loading. Impacts are generally associated with past activities and abandoned mines, since presently operating mines are required to employ environmental safeguards established by the Federal Surface Mining Control and Reclamation Act of 1977 and the Clean Water Act of 1972 (U.S. Fish and Wildlife Service 1998). Old, abandoned mines will continue to contribute pollutants to streams for the foreseeable future. At present levels of manpower and funding, it will take 166 years to reclaim known mines in the Basin (W. Cartwright, Alabama Department of Industrial Relations, pers. comm. 1999).

Forestry operations and highway construction are also sources of nonpoint pollution when Best Management Practices (BMPs) are not followed to protect streamside management zones (Hartfield 1990, U.S. Fish and Wildlife Service 1998). Logging can cause erosion, siltation, and stream bed structural changes from the introduction of tree slash. Highway construction and bridge replacements can also result in increased sedimentation, and runoff may introduce toxic chemicals into streams. In addition, highway construction may reroute streams or change their shape.

Dodd et al. (1986) concluded that sedimentation in the upper Black Warrior River system negatively affected the flattened musk turtle by: (1) reduction of mollusks and other invertebrates used as food; (2) physical alteration of rocky habitats where the animals forage and take cover, and (3) accumulation of substrate in which chemicals toxic to animals and their prey persist. Habitat degradation is the primary factor that has reduced the distribution of viable flattened musk turtle populations to an estimated 15 percent of

their historical distribution in the upper Black Warrior system (U.S. Fish and Wildlife Service 1990). Black Warrior waterdogs have probably experienced similar declines. They are vulnerable to sedimentation since they spend virtually all of their lives at the stream bottom. Therefore, they are in almost constant contact with any toxic sediments that may be present (Bailey 1995).

Creation of large impoundments within the Black Warrior Basin has flooded thousands of square hectares (acres) of habitat previously considered appropriate for the Black Warrior waterdog. Impoundments do not have the shallow, flowing water preferred by the species. As a result, they are likely marginal or unsuitable habitat for the salamander. The abundance of predatory fish in impoundments further renders these lakes unsuitable for the Black Warrior waterdog. Impoundments have been trapped for waterdogs and flyers have been circulated (offering a reward for the species) to 187 bait shops, marinas, conservation officers, and other individuals throughout the target area (Bailey 1995, Guyer 1997). As a result of these efforts, only three Black Warrior waterdogs have been reported from impoundments (Bailey 2000). All three specimens were captured by fishermen fishing off a bank or near streams that empty into the reservoirs. The question remains whether impoundments represent suitable habitat or are habitat sinks. Given the habitat requirements of the species, it seems unlikely that a viable population of Black Warrior waterdogs could be sustained in an impoundment.

Hartfield (1990) summarized the number of miles of streams affected by these impoundments. He found that the entire main channel of the Black Warrior River, over 272 kilometers (km) (170 miles (mi)), has been affected. At least 32 km (20 mi) of the lower reach of the Locust Fork, 64 km (40 mi) of the lower Mulberry Fork, 48 km (30 mi) of the North River, and 48 km (30 mi) of the Sipsey Fork (and at least as many kilometers of its tributaries) have been impounded or are affected by impoundments.

The Sipsey Fork is the best remaining locality for the Black Warrior waterdog (Guyer 1998). Bailey and Guyer (1998) recently completed a study of the flattened musk turtle at this site. They found that the turtle population was declining and suggested that habitat quality is deteriorating at this site.

B. Overutilization for commercial, recreational, scientific, or educational purposes. Direct take of Black Warrior waterdogs for commercial, recreational, scientific, or educational purposes is not currently considered to be a threat.

C. Disease or predation. Disease and predation are not known to be factors in the decline of the Black Warrior waterdog.

D. The inadequacy of existing regulatory mechanisms. The State of Alabama provides no protection for the Black Warrior waterdog (J. Godwin, Alabama Natural Heritage Program, pers. comm. 1999). The Federal Surface Mining Control and Reclamation Act of 1977 and the Clean Water Act of 1972 have been ineffective in preventing the

continued decline of species in the Black Warrior Basin (Dodd et al. 1986, Mettee et al. 1989, Hartfield 1990, Bailey and Guyer 1998, U.S. Fish and Wildlife Service 1998).

E. Other natural or manmade factors affecting its continued existence. The remaining Black Warrior waterdog populations are isolated from each other by unsuitable habitat created by impoundments, pollution, or other factors. The fragmentation of habitat renders populations vulnerable to catastrophic events such as flood, drought, or chemical spills. In addition, if stream quality improves within areas of the Basin, impoundments and polluted reaches will act as barriers to reestablishment of Black Warrior waterdog populations.

BRIEF SUMMARY OF REASONS FOR REMOVAL OR LISTING PRIORITY CHANGE:

FOR RECYCLED PETITIONS:

a. Is listing still warranted? ___

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? ___

c. Is a proposal to list the species as threatened or endangered in preparation? ___

d. If the answer to c. above is no, provide an explanation of why the action is still precluded.

LAND OWNERSHIP (Estimate proportion Federal/state/local government/private, identify non-private owners): Federal ownership 10 percent (Bankhead National Forest); private ownership 90 percent.

PRELISTING (Describe status of conservation agreements or other conservation activities): None.

REFERENCES (Identify primary sources of information (e.g., status reports, petitions, journal publications, unpublished data from species experts) using formal citation format):

Ashton, R.E., Jr. and B. Peavy. 1985. Tenn-Tom Waterway Necturus project. Unpublished report submitted to Alabama Department of Conservation and Natural Resources, Montgomery, AL. 15 pp.

Ashton, R.E., Jr., and J. Peavy. 1986. Black Warrior waterdog. Pgs. 63-64 In: R.H. Mount (ed.), Vertebrate animals of Alabama in need of special attention. Alabama Agricultural Experiment Station, Auburn University, Auburn, AL.

Bailey, K.A. and C. Guyer. 1998. Demography and population status of the flattened musk turtle, Sternotherus depressus, in the Black Warrior River Basin of Alabama. Chelonian Conservation and Biology 3:77-83.

Bailey, M.A. 1992. Black Warrior waterdog status survey: Unpublished report submitted to Alabama Department of conservation and Natural Resources, Montgomery, AL. 27 pp.

Bailey, M.A. 1995. Black Warrior waterdog survey 1994-95: Performance report. Unpublished report submitted to Alabama Department of Conservation and Natural Resources, Montgomery, AL. 27 pp.

Bailey, M.A. 2000. Habitat assessment of known occurrences of the Black Warrior waterdog (Necturus alabamensis). Unpublished report prepared for the U.S. Fish and Wildlife Service, Jackson, MS. 24 pp. + appendices.

Bart, H.L., Jr., M.A. Bailey, R.E. Ashton, Jr., and P.E. Moler. 1997. Taxonomic and nomenclatural status of the Upper Black Warrior River waterdog. Journal of Herpetolgy 31:192-201.

Bishop, S.C. 1943. Handbook of salamanders. Comstock Publishing Company, Inc., Ithaca, NY.

Brode, W.E. 1969. A systematic study of salamanders in the genus, Necturus Rafinesque. Unpublished PhD. Dissertation, University of Southern Mississippi, Hattiesburg, MS.

Deutsch, W.G., W.C. Seesock, E.C. Webber, and D.R. Bayne. 1990. The impact of poultry rearing operations on water quality and biological communities of second order streams in Cullman and Winston counties, Alabama, 1988-89. Auburn University, Department of Fisheries and Allied Aquacultures, Auburn, AL. 62 pp.

Dodd, C.K., Jr. 1990. Effects of habitat fragmentation on a stream-dwelling species, the flattened musk turtle, Sternotherus depressus. Biological Conservation 54:33-45.

Dodd, C.K., K.M. Enge, and J.N. Stuart. 1986. The effects of mining siltation on the distribution and abundance of the flattened musk turtle, Sternotherus depressus, in northern Alabama. Denver Wildlife Research Center, Gainevsille, FL 82 pp.

Gunter, G. and W.E. Brode. 1964. Necturus in the state of Mississippi, with notes on adjacent areas. Herpetologica 20:114-126.

Guttman, S.I., L.A. Weight, P.E. Moler, R.E. Ashton, B.W. Mansell, and J. Peavy. 1990. An electrophoretic analysis of Necturus from the southeastern United States. Journal of Herpetology 24:163-175.

Guyer, C. 1997. A status survey of the Black Warrior waterdog (Necturus sp.). Unpublished report submitted to Alabama Department of Conservation and Natural Resources, Montgomery, AL. 16 pp.+ figures and appendix.

Guyer, C. 1998. Historical affinities and population biology of the Black Warrior waterdog (Necturus alabamensis). Unpublished report submitted to Alabama Department of Conservation and Natural Resources, Montgomery, AL. 12 pp.

Guyer, C. and M. Durflinger. 1999. A demographic study of the Black Warrior waterdog (Necturus alabamensis):Final report. Unpublished report submitted to the Alabama Department of Conservation, Montgomery, AL. 9 pp.

Hartfield, P. 1990. Status survey for mussels in the tributaries of the Black Warrior River, Alabama. U.S. Fish and Wildlife Service, Jackson, MS. 8 pp.

Hecht, M.K. 1958. A synopsis of the mud puppies of eastern North America. Proceedings of the Staten Island Institute of Arts and Sciences 21:1-38.

Maxson, L.R., P.E. Moler, and B.W. Mansell. 1988. Albumin evolution in salamanders of the genus Necturus (Amphibia: Proteidae). Journal of Herpetology 22:231-235.

Mettee, M.F., P.E. O'Neill, J.M. Pierson, and R.D. Suttkus. 1989. Fishes of the Black Warrior River system in Alabama. Geological Survey of Alabama Bulletin 133. 201 pp.

Mount, R.H. 1975. The reptiles and amphibians of Alabama. Agricultural Experimental Station, Auburn University, Auburn, AL.

Mount, R.H. 1981. The status of the flattened musk turtle, Sternotherus minor depressus Tinkle and Webb. Unpublished report to the U.S. Fish and Wildlife Service, Jackson, MS. 119 pp.

Neil, W.T. 1963. Notes on the Alabama waterdog, Necturus alabamensis Viosca. Herpetologica 19:166-174.

Shepard, T.E., P.E. O'Neil, and S.W. McGregor. 1997. Biological assessment of the Locust Fork system, 1997. Unpublished report submitted to Alabama Department of Conservation and Natural Resources by Geological Survey of Alabama, Tuscaloosa, AL. 37 pp.

U.S. Fish and Wildlife Service (USFWS). 1990. Flattened musk turtle recovery plan. Jackson, MS. 15 pp.

U.S. Fish and Wildlife Service (USFWS). 1998. Technical/agency draft Mobile River Basin ecosystem recovery plan. Jackson, MS. 112 pp.

Viosca, P., Jr. 1937. A tentative revision of the genus Necturus, with descriptions of three new species from the southern Gulf drainage area. Copeia 1937:120-138.

LISTING PRIORITY (place * after number)

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5*
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes to the candidate list, including listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all additions of species to the candidate list, annual retentions of candidates, removal of candidates, and listing priority changes.

Approve: _____ _____
Regional Director, Fish and Wildlife Service Date

Concur: _____ _____
Director, Fish and Wildlife Service Date

Do not concur: _____ _____
Director, Fish and Wildlife Service Date

Director's Remarks: _____

_____

Date of annual review: January 2001

Conducted by: Linda LaClaire - Jackson, Mississippi FO

Changes from October 25, 1999 CNOR(check one) Yes X No

Approval: _____ _____
Regional Director Dated

Comments: _____

(rev. 6/00)